

## Appendix F: Diseases

Viruses, bacteria, fungi, and parasites cause diseases in nearly every location worldwide. Some diseases, which are carried or transmitted by an animal, are known as “vector-borne” diseases. Where appropriate, the scientific name of the disease organism, or vector, is included in italics in tables F-1 and F-2.

This guide is not intended to cover every health risk in every location, but it provides information about some common diseases. Always check with your health care provider before travelling out of the country to learn about specific health risks for the region in which you will conduct your research.

All field researchers, regardless of the work location, should read through table F-1 to learn more about some general diseases that exist worldwide. If your research is in North America, please also read table F-2. If your research will take you out of North America, also read table F-3.

<b>Table F-1: Diseases Found Worldwide</b>					
<i>Type</i>	<i>Location</i>	<i>Exposure Route</i>	<i>Symptoms</i>	<i>First Aid</i>	<i>Prevention</i>
Food-borne Diseases: <i>Campylobacter</i>	Worldwide	Poultry Products	Diarrhea Gastrointestinal symptoms	Drink plenty of fluids. Seek medical attention if symptoms persist for longer than 3 days.	Always cook food thoroughly.
Food-borne Diseases: <i>Cholera</i>	Africa, Asia, Latin America	Contaminated food and water	Diarrhea Gastrointestinal symptoms	Drink plenty of fluids. Seek medical attention if symptoms persist for longer than 3 days.	Always cook food thoroughly. Do not drink impure water.

<b>Table F-1: Diseases Found Worldwide</b>					
<i>Type</i>	<i>Location</i>	<i>Exposure Route</i>	<i>Symptoms</i>	<i>First Aid</i>	<i>Prevention</i>
Foodborne Diseases: E. Coli	Worldwide	Beef, unpasteurized milk, unwashed raw vegetables, contaminated water	Diarrhea Gastrointestinal symptoms	Drink plenty of fluids. Seek medical attention if symptoms persist for longer than 3 days.	Always cook food thoroughly. Wash vegetables before consuming. Do not drink impure water.
Foodborne Diseases: Hepatitis A (vaccine available)	Worldwide (underdeveloped countries)	Contaminated water, shellfish, unwashed raw vegetables	Diarrhea, Gastrointestinal symptoms	Drink plenty of fluids. Seek medical attention if symptoms persist for longer than 3 days.	Obtain a vaccine. Consult with your doctor at least 1 month before departing. Always cook food thoroughly. Wash vegetables before eating. Do not drink impure water.
Foodborne Diseases: Salmonella	Worldwide	Beef, poultry, milk, eggs, unwashed raw vegetables	Diarrhea, Gastrointestinal symptoms	Drink plenty of fluids. Seek medical attention if symptoms persist for longer than 3 days.	Obtain a vaccine. Consult with your doctor at least 1 month prior to departure. Always cook food thoroughly. Wash vegetables before consuming.
Foodborne Diseases: Typhoid Fever (Vaccine Available)	Worldwide	Contaminated food and water	Diarrhea, Gastrointestinal symptoms	Drink plenty of fluids. Seek medical attention if symptoms persist for longer than 3 days.	Obtain a vaccine. Always cook food thoroughly. Never drink water from an impure source.

Table F-1: Diseases Found Worldwide

Type	Location	Exposure Route	Symptoms	First Aid	Prevention
Chikungunya	Worldwide	Infection from the bite of a mosquito carrying the virus	Fever, Joint pain Headache, muscle pain, joint swelling or rash	Treat symptomatically.	Use repellents. Wear long pants & long sleeves. (Treat clothes with permethrin.) Avoid being bit by mosquitoes. Avoid areas of standing water where mosquitoes breed. People with virus should avoid mosquito bites during the first week of illness to minimize transmission to others.
Histoplasmosis	Worldwide (especially Mississippi & Ohio River Valleys)	Inhalation of fungus from soil contaminated with bat or bird droppings <i>Histoplasma capsulatum</i>	Mild flu-like symptoms Occasionally can turn into acute pulmonary histoplasmosis	See a doctor if you suspect histoplasmosis. Typically clears up in 3 weeks.	Use caution when disturbing dry soils or working near bat or bird droppings. Keep surfaces wet to reduce dust.
Leptospirosis	Worldwide	Ingestion, swimming, or other activities in water that is contaminated with the <i>Leptospira</i> bacteria	Flu-like symptoms Occasionally more serious symptoms	See a doctor if you suspect leptospirosis.	Use care when working in the water, especially after a flooding event. Avoid entering the water with open wounds.

Table F-1: Diseases Found Worldwide					
Type	Location	Exposure Route	Symptoms	First Aid	Prevention
Plague	Worldwide	Infection from flea bite (Fleas are infected by rodents.) <i>Yersinia pestis</i>	Flu-like symptoms; nonspecific symptoms; swollen and painful lymph nodes	See a doctor if you suspect plague.	Use care when working in areas where plague is found. Use caution when working with wild rodents. Wear gloves and wash hands frequently
Rabies (vaccine available)	Worldwide	Infection from bite of animal infected with <i>Lyssavirus</i>	Spasms Paralysis Fatal, without immediate treatment	See a doctor <b>IMMEDIATELY</b> if bitten by a rabies-carrying species (e.g. bats, carnivores).	Obtain the vaccine series if you will be working with bats or other carnivores. Use extreme caution handling these animals.
Tetanus (vaccine available)	Worldwide	Infection occurs after a wound. <i>Tetanus bacillus</i>	Painful muscle contractions	See a doctor if you suspect tetanus.	Obtain a tetanus shot every 10 years.
Typhus Fever	Worldwide	Infection from bite of lice, fleas, ticks, or mites <i>Rickettsiae</i> species	Headache Fever Rash	See a doctor if you suspect typhus fever. Treatable with antibiotics	Wear repellents. Wear long sleeved shirts. Tuck pants into boots.

<b>Table F-2: Diseases Found in North America</b>					
<b>Type</b>	<b>Location</b>	<b>Exposure Route</b>	<b>Symptoms</b>	<b>First Aid</b>	<b>Prevention</b>
Coccidiomycosis “Valley Fever”	North and South America: arid regions	Fungus is inhaled when soil is disturbed. <i>Coccidioides</i>	Flu-like symptoms Occasionally becomes severe lung disease	See a doctor if you suspect Valley Fever.	Use caution when in close contact with soil or dust and keep surfaces wet to reduce dust. African Americans, Filipinos, and immunocompromised are at greater risk than others.
Encephalitis	North and South America (St. Louis Encephalitis) and the U.S. (West Nile Virus)	Infection from bite of an infected mosquito	Mild: Fever and headache Severe: Headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, paralysis, and, very occasionally, death	Seek medical attention immediately if you suspect encephalitis.	Use repellents. Wear long pants and long sleeved shirts. Avoid being bit by mosquitoes. Avoid areas of standing water where mosquitoes breed.
Lyme Disease	United States, Europe, and Asia	Infection through the bite of an infected tick <i>Borrelia burgdorferi</i>	Spreading rash Early: Flu-like symptoms Later: Arthritis and neurologic problems	See a doctor if you suspect Lyme Disease.	Avoid tick-infested areas. Wear long pants and long sleeved shirts. Use a repellent. Check clothing and hair for ticks and remove any ticks.

Table F-2: Diseases Found in North America					
Type	Location	Exposure Route	Symptoms	First Aid	Prevention
Rocky Mountain Spotted Fever	United States, southern Canada, Mexico, and Central America	Infection through the bite of an infected tick <i>Rickettsia rickettsii</i>	Sudden onset of fever, headache, muscle pain, spotty rash	See a doctor if you suspect Rocky Mountain Spotted Fever.	Avoid tick-infested areas. Wear long pants and long sleeved shirts. Use a repellent. Check clothing and hair for ticks and remove any ticks.
Hantavirus Pulmonary Syndrome (HPS)/Sin Nombre Virus	North America	Inhalation of dusts or aerosols from the infected rodent's feces, urine, or saliva Vector: Deer mouse ( <i>Peromyscus maniculatus</i> )	Early (1 to 5 weeks): Fatigue, fever, muscle aches, and sometimes headaches, dizziness, chills, and abdominal problems. Late (4 to 10 days after early symptoms): Coughing, shortness of breath	Seek medical attention IMMEDIATELY if you suspect HPS. The likelihood of survival is greatly increased with early diagnosis and treatment.	Avoid contact with rodents, especially their feces. See below for details on how to clean and dispose of a rodent infected area.
Arenavirus (White Water Arroyo— WWA)	North America	Inhalation of dusts or aerosols from infected rodent's feces, urine, or saliva; Carried by Woodrats ( <i>Neotoma fuscipes</i> ) and other <i>Neotoma</i> species	Fever Headache Muscle aches Severe respiratory distress (occasionally)	Seek medical attention IMMEDIATELY if you suspect WWA. The likelihood of survival is greatly increased with early diagnosis and treatment.	Avoid contact with rodents, especially their feces. See next page for details on how to clean and dispose of a rodent-infected area.

Table F-3 Diseases found primarily Outside of North America

<i>Type</i>	<i>Location</i>	<i>Exposure Route</i>	<i>Symptoms</i>	<i>First Aid</i>	<i>Prevention</i>
Dengue Fever	Africa, Southeast Asia and China, India, the Middle East, South and Central America, Australia and the Pacific Islands	Infection from the bite of an infected mosquito	Flu-like symptoms, Rash, Takes up to 1 month to recover.	See a doctor if you suspect Dengue Fever.	Wear long sleeved shirts and long pants. Use repellents. Use a mosquito net.
Malaria (Preventable with Drugs)	Central and South America, Hispaniola, Africa, India, Southeast Asia, the Middle East, and Oceania	Infection from the bite of an infected mosquito	May take 10 to 30 days for symptoms to appear. Flu-like symptoms Anemia Jaundice Can be fatal.	See a doctor if you suspect Malaria	Visit doctor 4 to 6 weeks before travel for anti-malarial drugs. Wear long pants and long sleeved shirts. Use repellents. Use a mosquito net.
Yellow Fever (Vaccine Available)	South America and Africa	Infection from the bite of an infected mosquito	Flu-like symptoms Jaundice Can be fatal.	See a doctor if you suspect Yellow Fever.	Visit doctor at least 10 days before travel for vaccine. Wear long pants and long sleeved shirts. Use repellents Use a mosquito net.

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<i>Type</i>	<i>Location</i>	<i>Exposure Route</i>	<i>Symptoms</i>	<i>First Aid</i>	<i>Prevention</i>
Hantavirus and Arenavirus	Central and South America and Asia	Inhalation of dusts or aerosols from the infected rodent's feces, urine, or saliva Vector: Rodents; especially <i>Neotoma</i> and <i>Peromyscus</i> species	Fever Headache Muscle aches. Severe respiratory distress (occasionally)	Seek medical attention IMMEDIATELY if you suspect hanta or arenavirus. Early treatment greatly increases the odds of survival.	Avoid contact with rodents, especially with their feces. See above for details on how to clean and dispose of a rodent infected area.
Schistomiasis	Brazil, Egypt, sub-Saharan Africa, southern China, the Philippines, and Southeast Asia	Transmitted by swimming in contaminated fresh water	Can be asymptomatic. Acute: (2 to 3 weeks) Fever, lack of appetite, weight loss, abdominal pain, weakness, headaches, joint and muscle pain, diarrhea, nausea, and cough Chronic: Disease in the lungs, liver, intestines, or bladder	See a doctor if you suspect schistomiasis.	Avoid freshwater wading or swimming in endemic regions. Heat bath water over 50°C for at least 5 minutes before use.



Table F-3 Diseases found primarily Outside of North America

<i>Type</i>	<i>Location</i>	<i>Exposure Route</i>	<i>Symptoms</i>	<i>First Aid</i>	<i>Prevention</i>
Ebola	Primarily Africa, but could spread to other areas.	Direct contact (via broken skin or mucous membranes) with blood or body fluids of a person who is sick with or has died from Ebola, objects contaminated with blood or body fluids from a sick person, or infected fruit bats or primates.	Fever, severe headache, muscle pain, weakness, fatigue, diarrhea, vomiting, abdominal pain, unexplained bleeding or bruising. May occur 2 – 21 days after exposure; average is 8 – 10 days.	Seek medical attention IMMEDIATELY. Early treatment greatly increases the odds of survival.	Avoid contact with persons sick with Ebola. Staff caring for Ebola patients must follow prevention advice from the WHO and CDC.

Table F-3 Diseases found primarily Outside of North America					
Type	Location	Exposure Route	Symptoms	First Aid	Prevention
<p>Zika Virus  <a href="http://www.cdc.gov/zika/index.html">http://www.cdc.gov/zika/index.html</a></p>	<p>Prior to 2015, Zika virus outbreaks occurred in areas of Africa, Southeast Asia, and the Pacific Islands. In May 2015, the Pan American Health Organization (PAHO) issued an alert regarding the first confirmed Zika virus infections in Brazil. Currently, outbreaks are occurring in many countries. Zika virus will continue to spread and it will be difficult to determine how and where the virus will spread over time.  <a href="#">For the latest Travel Notice Information</a></p>	<p>Through mosquito bites                      From Mother to child                      Through sexual contact                      Through blood transfusion</p>	<p>Most people infected with Zika virus won't even know they have the disease because they won't have symptoms. The most common symptoms of Zika are fever, rash, joint pain, or conjunctivitis (red eyes). Other common symptoms include muscle pain and headache. The incubation period (the time from exposure to symptoms) for Zika virus disease is not known, but is likely to be a few days to a week.</p>	<p>There is no vaccine to prevent or medicine to treat Zika virus. Treat the symptoms: Get plenty of rest. Drink fluids to prevent dehydration. Take medicine such as acetaminophen (Tylenol®) or paracetamol to reduce fever and pain. Do not take aspirin and other non-steroidal anti-inflammatory drugs (NSAIDS) until dengue can be ruled out to reduce the risk of bleeding. If you are taking medicine for another medical condition, talk to your healthcare provider before taking additional medication.</p>	<p>No vaccine exists to prevent Zika virus disease (Zika).                      Prevent Zika by avoiding mosquito bites (see below).                      Mosquitoes that spread Zika virus bite mostly during the daytime.                      Mosquitoes that spread Zika virus also spread dengue and chikungunya viruses.  <a href="#">Prevent sexual transmission of Zika by using condoms or not having sex</a></p>

## Waterborne Diseases

Waterborne diseases are caused by [pathogenic microorganisms](#) which are directly transmitted when contaminated fresh water is consumed.

Waterborne disease can be caused by [protozoa](#), [viruses](#), or [bacteria](#), many of which are [intestinal parasites](#).

Protozoal Infections			
<i>Disease and Transmission</i>	<i>Microbial Agent</i>	<i>Sources of Agent in Water Supply</i>	<i>General Symptoms</i>
<a href="#">Amoebiasis</a> (hand-to-mouth)	Protozoan ( <a href="#">Entamoeba histolytica</a> ) (Cyst-like appearance)	<a href="#">Sewage</a> , <a href="#">non-treated drinking water</a> , <a href="#">flies</a> in water supply	Abdominal discomfort, <a href="#">fatigue</a> , weight loss, <a href="#">diarrhea</a> , <a href="#">bloating</a> , <a href="#">fever</a>
<a href="#">Balantidiasis</a> , also Balantidosis	<a href="#">Balantidium coli</a>	fecally contaminated water	<a href="#">Diarrhea</a> or constipation
<a href="#">Cryptosporidiosis</a> (oral)	Protozoan ( <a href="#">Cryptosporidium parvum</a> )	Collects on water filters and membranes that cannot be <a href="#">disinfected</a> , <a href="#">animal manure</a> , seasonal <a href="#">runoff</a> of water.	<a href="#">Flu-like symptoms</a> , watery diarrhea, loss of appetite, substantial loss of weight, <a href="#">bloating</a> , increased gas, <a href="#">nausea</a>
<a href="#">Cyclosporiasis</a>	Protozoan parasite ( <a href="#">Cyclospora cayetanensis</a> )	<a href="#">Sewage</a> , <a href="#">non-treated drinking water</a>	<a href="#">cramps</a> , nausea, <a href="#">vomiting</a> , muscle aches, fever, and fatigue
<a href="#">Giardiasis</a> (oral-fecal) (hand-to-mouth)	Protozoan ( <a href="#">Giardia lamblia</a> ) Most common intestinal parasite	Untreated water, poor disinfection, pipe breaks, leaks, <a href="#">groundwater</a> contamination, <a href="#">campgrounds</a> where humans and wildlife use same source of water. <a href="#">Beavers</a> and <a href="#">muskrats</a> create <a href="#">ponds</a> that act as <a href="#">reservoirs</a> for Giardia.	Diarrhea, abdominal discomfort, <a href="#">bloating</a> , and <a href="#">flatulence</a>

<b>Protozoal Infections</b>			
<i>Disease and Transmission</i>	<i>Microbial Agent</i>	<i>Sources of Agent in Water Supply</i>	<i>General Symptoms</i>
<a href="#">Meningoencephalitis</a> (primary amoebic)	Protozoan ( <a href="#">Naegleria fowleri</a> )	warm stagnant fresh water	<a href="#">olfactory dysfunction</a> , eventually <a href="#">inability to smell</a> and <a href="#">taste</a> , nausea, rigidity of the neck, vomiting, delirium, seizures, and eventually irreversible coma
<a href="#">Microsporidiosis</a>	Protozoan phylum ( <a href="#">Microsporidia</a> ), but closely related to <a href="#">fungi</a>	The genera of <a href="#">Encephalitozoon intestinalis</a> has been detected in <a href="#">groundwater</a> , the origin of drinking water <sup>[3]</sup>	Diarrhea and <a href="#">wasting</a> in <a href="#">immunocompromised</a> individuals
<a href="#">Toxoplasmosis</a>	Protozoan ( <a href="#">Toxoplasma gondii</a> )	faecally contaminated water	when acute: <a href="#">flu-like symptoms</a> , swollen lymph nodes, or muscle aches or pains

<b>Parasitic Infections (Kingdom Animalia)</b>			
<i>Disease and Transmission</i>	<i>Microbial Agent</i>	<i>Sources of Agent in Water Supply</i>	<i>General Symptoms</i>
<a href="#">Schistosomiasis</a> (immersion)	Members of the genus <a href="#">Schistosoma</a>	Fresh water contaminated with certain types of snails that carry schistosomes	Rash or itchy skin. Fever, chills, cough, and muscle aches
<a href="#">Dracunculiasis</a> (Guinea Worm Disease)	<a href="#">Dracunculus medinensis</a>	Stagnant water containing larvae	Allergic reaction, urticaria rash, nausea, vomiting, diarrhea, asthmatic attack.
<a href="#">Taeniasis</a>	Tapeworms of the genus <a href="#">Taenia</a>	Drinking water contaminated with eggs	Intestinal disturbances, neurologic manifestations, loss of weight, cysticercosis

<b>Parasitic Infections (Kingdom Animalia)</b>			
<i>Disease and Transmission</i>	<i>Microbial Agent</i>	<i>Sources of Agent in Water Supply</i>	<i>General Symptoms</i>
<a href="#">Fasciolopsiasis</a>	<a href="#">Fasciolopsis buski</a>	Drinking water contaminated with encysted metacercaria	GIT disturbance, diarrhea, liver enlargement, cholangitis, cholecystitis, obstructive jaundice.
<a href="#">Hymenolepiasis</a> (Dwarf Tapeworm Infection)	<a href="#">Hymenolepis nana</a>	Drinking water contaminated with eggs	Abdominal pain, anorexia, itching around the anus, nervous manifestation
<a href="#">Echinococcosis</a> (Hydatid disease)	<a href="#">Echinococcus granulosus</a>	Drinking water contaminated with feces (usually <a href="#">canid</a> ) containing eggs	Liver enlargement, hydatid cysts press on bile duct and blood vessels; if cysts rupture they can cause anaphylactic shock
<a href="#">coenurosis</a>	multiceps multiceps	contaminated drinking water with eggs	increases intracranial tension
<a href="#">Ascariasis</a>	<a href="#">Ascaris lumbricoides</a>	Drinking water contaminated with feces (usually <a href="#">canid</a> ) containing eggs	Mostly, disease is asymptomatic or accompanied by <a href="#">inflammation</a> , fever, and diarrhea. Severe cases involve <a href="#">Löffler's syndrome</a> in lungs, nausea, vomiting, <a href="#">malnutrition</a> , and <a href="#">underdevelopment</a> .
<a href="#">Enterobiasis</a>	<a href="#">Enterobius vermicularis</a>	Drinking water contaminated with eggs	Peri-anal itch, nervous irritability, hyperactivity and insomnia

<b>Bacterial Infections</b>			
<i>Disease and Transmission</i>	<i>Microbial Agent</i>	<i>Sources of Agent in Water Supply</i>	<i>General Symptoms</i>
<a href="#"><u>Botulism</u></a>	<a href="#"><u><i>Clostridium botulinum</i></u></a>	Bacteria can enter a wound from contaminated water sources. Can enter the gastrointestinal tract by consuming contaminated <a href="#"><u>drinking water</u></a> or (more commonly) food	Dry mouth, <a href="#"><u>blurred</u></a> and/or <a href="#"><u>double vision</u></a> , difficulty swallowing, muscle weakness, difficulty breathing, slurred speech, <a href="#"><u>vomiting</u></a> and sometimes <a href="#"><u>diarrhea</u></a> . Death is usually caused by <a href="#"><u>respiratory failure</u></a> .
<a href="#"><u>Campylobacteriosis</u></a>	Most commonly caused by <a href="#"><u><i>Campylobacter jejuni</i></u></a>	Drinking water contaminated with <a href="#"><u>feces</u></a>	Produces <a href="#"><u>dysentery</u></a> like symptoms along with a <a href="#"><u>high fever</u></a> . Usually lasts 2–10 days.
<a href="#"><u>Cholera</u></a>	Spread by the bacterium <a href="#"><u><i>Vibrio cholerae</i></u></a>	Drinking water contaminated with the bacterium	In severe forms it is known to be one of the most rapidly fatal illnesses known. Symptoms include very watery diarrhea, <a href="#"><u>nausea</u></a> , <a href="#"><u>cramps</u></a> , <a href="#"><u>nosebleed</u></a> , rapid <a href="#"><u>pulse</u></a> , vomiting, and <a href="#"><u>hypovolemic shock</u></a> (in severe cases), at which point death can occur in 12–18 hours.
<a href="#"><u>E. coli Infection</u></a>	Certain strains of <a href="#"><u><i>Escherichia coli</i></u></a> (commonly <i>E. coli</i> )	Water contaminated with the bacteria	Mostly diarrhea. Can cause death in <a href="#"><u>immunocompromised</u></a> individuals, the very young, and the elderly due to <a href="#"><u>dehydration</u></a> from prolonged illness.
<a href="#"><u>M. marinum infection</u></a>	<a href="#"><u><i>Mycobacterium marinum</i></u></a>	Naturally occurs in water, most cases from exposure in <a href="#"><u>swimming pools</u></a> or more frequently <a href="#"><u>aquariums</u></a> ; rare infection since it mostly infects <a href="#"><u>immunocompromised</u></a> individuals	Symptoms include <a href="#"><u>lesions</u></a> typically located on the elbows, knees, and feet (from <a href="#"><u>swimming pools</u></a> ) or lesions on the hands ( <a href="#"><u>aquariums</u></a> ). Lesions may be painless or painful.

<b>Bacterial Infections</b>			
<b><i>Disease and Transmission</i></b>	<b><i>Microbial Agent</i></b>	<b><i>Sources of Agent in Water Supply</i></b>	<b><i>General Symptoms</i></b>
<a href="#"><u>Dysentery</u></a>	Caused by a number of species in the genera <a href="#"><u>Shigella</u></a> and <a href="#"><u>Salmonella</u></a> with the most common being <a href="#"><u>Shigella dysenteriae</u></a>	Water contaminated with the bacterium	Frequent passage of <a href="#"><u>feces</u></a> with <a href="#"><u>blood</u></a> and/or <a href="#"><u>mucus</u></a> and in some cases vomiting of blood.
<a href="#"><u>Legionellosis</u></a> (two distinct forms: Legionnaires' disease and Pontiac fever)	Caused by bacteria belonging to genus <a href="#"><u>Legionella</u></a> (90% of cases caused by <a href="#"><u>Legionella pneumophila</u></a> )	Contaminated water: the organism thrives in warm aquatic environments.	Pontiac fever produces milder symptoms resembling acute <a href="#"><u>influenza</u></a> without <a href="#"><u>pneumonia</u></a> . Legionnaires' disease has severe symptoms such as <a href="#"><u>fever</u></a> , <a href="#"><u>chills</u></a> , pneumonia (with cough that sometimes produces <a href="#"><u>sputum</u></a> ), <a href="#"><u>ataxia</u></a> , <a href="#"><u>anorexia</u></a> , muscle aches, <a href="#"><u>malaise</u></a> and occasionally diarrhea and vomiting
<a href="#"><u>Leptospirosis</u></a>	Caused by bacterium of genus <a href="#"><u>Leptospira</u></a>	Water contaminated by the animal urine carrying the bacteria	Begins with <a href="#"><u>flu-like symptoms</u></a> then resolves. The second phase then occurs involving <a href="#"><u>meningitis</u></a> , <a href="#"><u>liver</u></a> damage (causes <a href="#"><u>jaundice</u></a> ), and <a href="#"><u>renal failure</u></a>
<a href="#"><u>Otitis Externa</u></a> (swimmer's ear)	Caused by a number of <a href="#"><u>bacterial</u></a> and <a href="#"><u>fungal</u></a> species.	Swimming in water contaminated by the responsible pathogens	<a href="#"><u>Ear canal</u></a> swells causing pain and tenderness to the touch
<a href="#"><u>Salmonellosis</u></a>	Caused by many bacteria of genus <a href="#"><u>Salmonella</u></a>	Drinking water contaminated with the bacteria. More common as a <a href="#"><u>food borne illness</u></a> .	Symptoms include <a href="#"><u>diarrhea</u></a> , <a href="#"><u>fever</u></a> , vomiting, and abdominal cramps

<b>Bacterial Infections</b>			
<i>Disease and Transmission</i>	<i>Microbial Agent</i>	<i>Sources of Agent in Water Supply</i>	<i>General Symptoms</i>
<a href="#">Typhoid fever</a>	<a href="#">Salmonella typhi</a>	Ingestion of water contaminated with <a href="#">feces</a> of an infected person	Characterized by sustained fever up to 40°C (104°F), profuse <a href="#">sweating</a> , diarrhea, less commonly a <a href="#">rash</a> may occur. Symptoms progress to <a href="#">delirium</a> and the <a href="#">spleen</a> and <a href="#">liver</a> enlarge if untreated. In this case it can last up to four weeks and cause death.
<a href="#">Vibrio Illness</a>	<a href="#">Vibrio vulnificus</a> , <a href="#">Vibrio alginolyticus</a> , and <a href="#">Vibrio parahaemolyticus</a>	Can enter <a href="#">wounds</a> from contaminated water. Also got by drinking contaminated water or eating undercooked <a href="#">oysters</a> .	Symptoms include explosive, watery diarrhea, nausea, vomiting, abdominal cramps, and occasionally fever.

<b>Viral Infections</b>			
<i>Disease and Transmission</i>	<i>Microbial Agent</i>	<i>Sources of Agent in Water Supply</i>	<i>General Symptoms</i>
<a href="#">Adenovirus infection</a>	<a href="#">Adenovirus</a>	Manifests itself in improperly <a href="#">treated water</a>	Symptoms include <a href="#">common cold symptoms</a> , <a href="#">pneumonia</a> , <a href="#">croup</a> , and <a href="#">bronchitis</a>
<a href="#">Gastroenteritis</a>	<a href="#">Astrovirus</a> , <a href="#">Calicivirus</a> , <a href="#">Enteric Adenovirus</a> , and <a href="#">Parvovirus</a>	Manifests itself in improperly <a href="#">treated water</a>	Symptoms include <a href="#">diarrhea</a> , <a href="#">nausea</a> , <a href="#">vomiting</a> , <a href="#">fever</a> , <a href="#">malaise</a> , and abdominal pain



<b>Viral Infections</b>			
<i>Disease and Transmission</i>	<i>Microbial Agent</i>	<i>Sources of Agent in Water Supply</i>	<i>General Symptoms</i>
<a href="#">SARS</a> (Severe Acute Respiratory Syndrome)	<a href="#">Coronavirus</a>	Manifests itself in improperly treated water	Symptoms include <a href="#">fever</a> , <a href="#">myalgia</a> , <a href="#">lethargy</a> , <a href="#">gastrointestinal</a> symptoms, <a href="#">cough</a> , and sore throat
<a href="#">Hepatitis A</a>	Hepatitis A virus (HAV)	Can manifest itself in water (and food)	Symptoms are only <a href="#">acute</a> (no <a href="#">chronic</a> stage to the virus) and include <a href="#">Fatigue</a> , fever, abdominal pain, nausea, diarrhea, weight loss, itching, <a href="#">jaundice</a> and <a href="#">depression</a> .
<a href="#">Poliomyelitis</a> (Polio)	<a href="#">Poliovirus</a>	Enters water through the <a href="#">feces</a> of infected individuals	90-95% of patients show no symptoms, 4-8% have minor symptoms (comparatively) with <a href="#">delirium</a> , <a href="#">headache</a> , <a href="#">fever</a> , and occasional <a href="#">seizures</a> , and <a href="#">spastic paralysis</a> , 1% have symptoms of non-paralytic <a href="#">aseptic meningitis</a> . The rest have serious symptoms resulting in <a href="#">paralysis</a> or death
<a href="#">Polyomavirus infection</a>	Two of <a href="#">Polyomavirus</a> : <a href="#">JC virus</a> and <a href="#">BK virus</a>	Very widespread, can manifest itself in water, 80% of the population has <a href="#">antibodies</a> to Polyomavirus	BK virus produces a mild <a href="#">respiratory infection</a> and can infect the <a href="#">kidneys</a> of <a href="#">immunosuppressed transplant</a> patients. JC virus infects the <a href="#">respiratory system</a> , kidneys or can cause <a href="#">progressive multifocal leukoencephalopathy</a> in the <a href="#">brain</a> (which is fatal).

### Other Diseases (Vector-Borne)

Many other vector-borne diseases may pose a problem when travelling out of the country. Always check with a physician to learn the specific threats in your location of study. Some other vector-borne diseases include:

- African Sleeping Sickness: carried by the tsetse fly in Africa
- Chagas Disease: transmitted by the Conenose bug in South America
- Encephalitis: carried by mosquitoes in Asia and eastern Russia
- Leishmaniasis: transmitted by sand flies in the tropics and subtropics
- Filariasis: carried by mosquitoes in the tropics
- Onchocerciasis causes “river blindness” and is carried by black flies in Africa, Arabia, and Central and South America.

### Other Diseases (General)

There are other diseases to be aware of when travelling outside the United States. While risk of infection is generally low, it is important to be aware of them and take appropriate precautions to guard against diseases such as tuberculosis, HIV/AIDS, SARS, and viral hemorrhagic fevers. Always check with your health care provider to learn more about specific diseases that exist in the region where you will be conducting your research.

### Proper Rodent Handling

Steps can be taken to reduce the risk of rodent-borne diseases. Most important: Make the area unattractive to rodents. Cover or repair holes into a building to prevent unwanted rodents. If camping, keep the area clean of trash and store food carefully to prevent attracting rodents. Don't camp near rodent burrows. Please refer to “Animals and Pests: General” for further tips on how to prevent rodent infestations.

If rodent feces or dead rodents are discovered, some precautions will help reduce the risk of exposure to rodent-borne diseases when cleaning the area:

**Dead Rodent:** Using gloves, spray the dead rodent with a solution of 1.5 cups bleach to 1 gallon of water.

**Rodent Feces:** Don't sweep or vacuum rodent droppings. Spray the droppings first with a bleach solution (1.5 cups bleach to 1 gallon of water). Then wipe up the droppings. If possible, wet mop the area with the bleach solution.



## Resources

Many available resources may provide more in-depth information regarding your work environment.

### Centers for Disease Control and Prevention Travel Information

<http://www.cdc.gov/travel/travel.html>

**U.S. State Department/ Bureau of Consular Affairs** (list of US Embassies & Consulates)

<http://travel.state.gov/>

**U.S. State Department Travel Warnings**

[http://travel.state.gov/travel\\_warnings.html](http://travel.state.gov/travel_warnings.html)

**CDC Guidelines for Outdoor Workers**

<http://www.cdc.gov/niosh/topics/outdoor/>

**Medical Information** about a variety of illnesses, including dehydration, carbon monoxide poisoning, sunburn, excessive heat, hypothermia, and high altitude sicknesses, can be found on-line at <http://www.webmd.com>.

**Diseases:** The CDC offers more detailed information about many diseases on their web site at <http://www.cdc.gov/travel/diseases.htm>.

**Weather:** More information on extreme weather and how to protect yourself can be found from the National Weather Service at

<http://weather.gov/safety.html>.

**Impure Water:** For more information about water-borne diseases, the CDC provides information on-line at

<http://www.cdc.gov/healthywater/disease/>.

**Hantavirus:** The CDC has detailed information about Hantavirus available at

<http://www.cdc.gov/ncidod/diseases/hanta/hps/noframes/generalinfoindex.htm>.

**Hunting Season:** To get more information concerning hunting seasons and regulations, contact the U.S. Forest Service on-line at

<http://www.fs.fed.us/>.

**Lyme Disease:** The American Lyme Disease Foundation provides information about the disease at <http://www.aldf.com/>.

**Poisonous Plants:** More information about poison plants, including photos, can be found at <http://poisonivy.aesir.com/>.